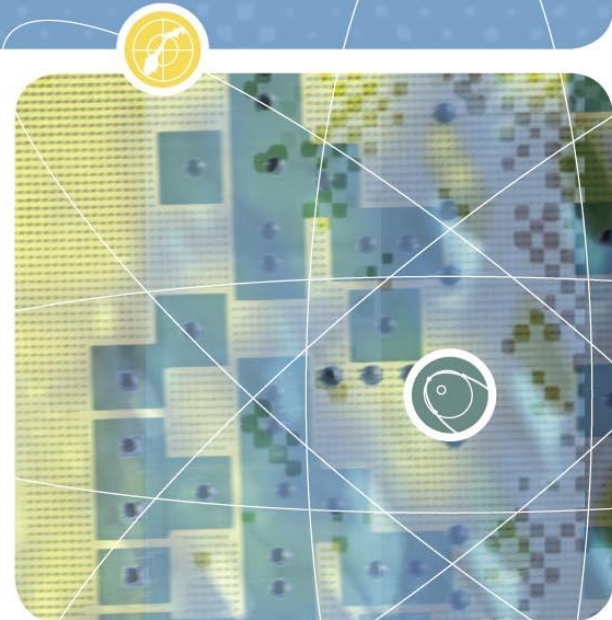


What is C-BML?

An overview

MSG-79 C-BML Workshop
23. February 2010
Farnborough, UK

Ole Martin Mevassvik
Principal Scientist
FFI (Norwegian Defence
Research Establishment)

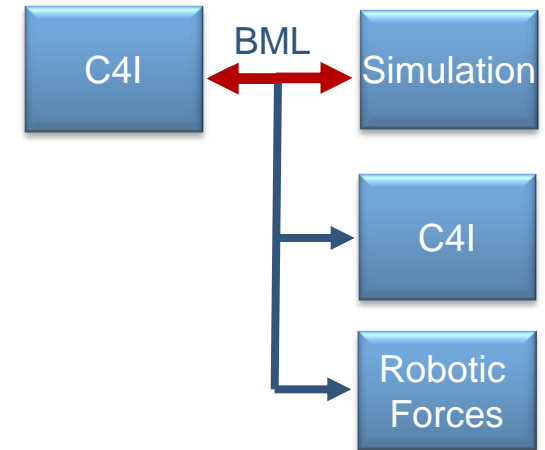


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Why Battle Management Language?

- Standardizing C2 to simulation interoperability
- Digitizing C2 information to represent plans, orders and reports
- Benefits:
 - Enables M&S Technologies to support C2 Processes
 - Simulating plans and orders without manual transfer of data between C2 and M&S systems
 - Many potential applications: training, planning, mission rehearsal, C2-C2, robotics...





A definition

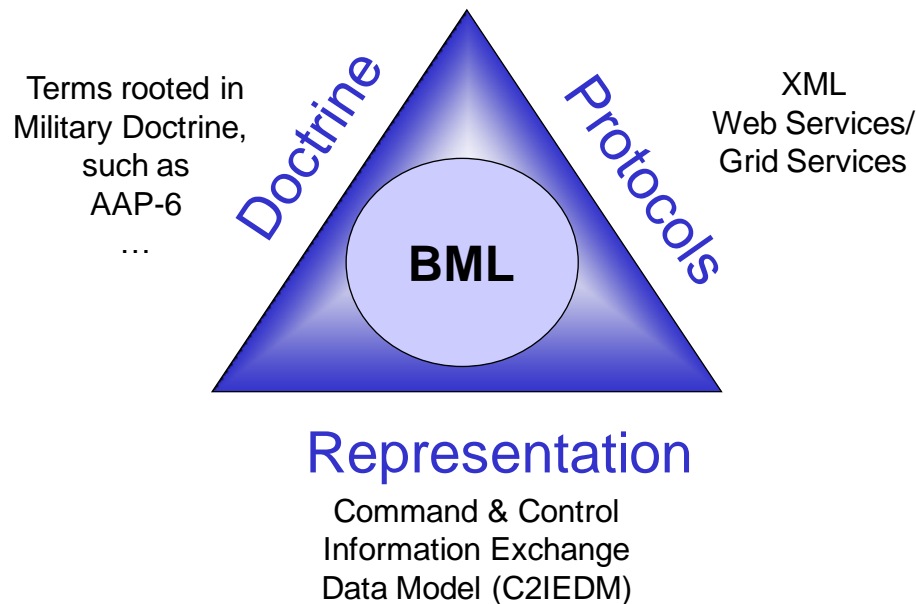
A Battle Management Language (BML) is defined as an unambiguous language intended to provide for

- (1) command and control of simulated and live forces conducting military operations and
- (2) situational awareness and a shared, common operational picture.



Three views of BML

- BML can be described by
 - Doctrine: Terms rooted in "military language"
 - Representation: How to describe missions, tasks...
 - Protocols: How to exchange BML



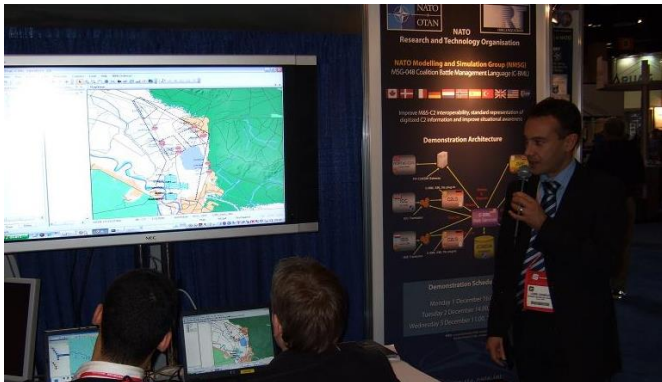
Tolk et. al, "Merging National BML initiatives for NATO Projects", MSG-028, Koblenz, 2004

Applications of C-BML

- Support of planning, Course of Action (COA) Analysis
 - BML is an enabling technology for use of M&S for planning and decision support
- Training & mission rehearsal
 - Improve effectiveness of command and staff training and reduce the number of operators
- Robotic forces
 - Formal unambiguous language allows automatic interpretation of tasks
- C2 to C2
 - More precise and understandable exchange of plans and orders

Coalition BML (C-BML) in context of MSG-048

- Orders structured using 5W's "Who, What, When, Where and Why"
- Focuses on the "Execution" part of an Operation Order (OPORD)
- A formal tasking grammar, C2 Lexical Grammar (C2LG), ensures an executable BML
- Based on multi-national/NATO C2 standard – Joint Command, Control and Consultation Information Exchange Data Model (JC3IEDM)
- Exchange of C-BML using XML and Web Services
- Two-way information exchange (orders and reports)

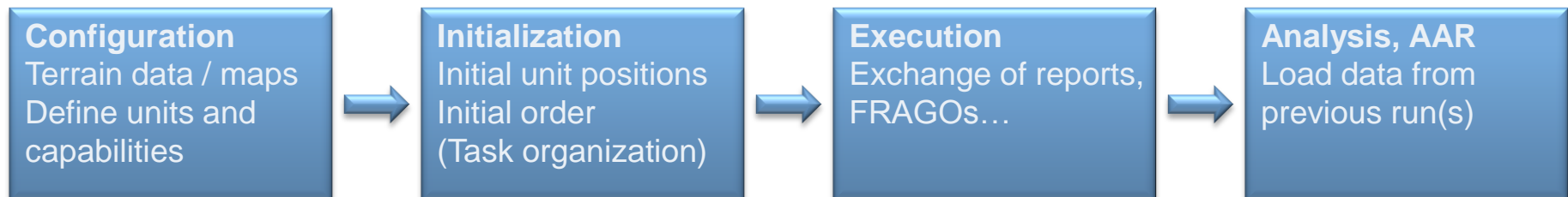




Employment of C-BML

Lessons learned from the use of BML

- Services needed to efficiently use BML
 - Configuration of C2 and simulation systems (define units, capabilities, terrain...)
 - Initialization of C2 and simulation (initial order & positions, task organization...)
 - Time management: two-way exchange of information during non-real time simulation (scaled time)
 - Scalable information exchange, e.g. through publish & subscribe



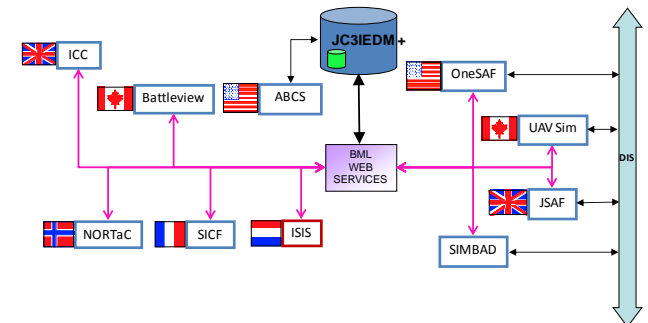


SISO standardization

- Ongoing Product Development Group on C-BML
- Phased approach for development of C-BML. For each phase
 - Data model
 - Structure and representation of information
 - Information exchange mechanism
 - Guidelines
- MSG-048 provides feedback to SISO

A BML example

- Battalion OPORD developed by the Norwegian Army Land Warfare Centre for the 2009 experiment
- Documented as free text and graphics
- The order needed additional elaboration and clarification to be put into BML
- Final order put into Norwegian Tactical C2IS (NORTaC-C2IS)
- Simulated by APLET (FRA) and JSAF (UK) during the experiment



1. SITUATION

a. Enemy Forces

- Annex B Intel

b. Friendly Forces

(1) Higher Commander's Mission

- O/O 1BCT conducts mounted attack 100400Apr 2010 along axes PORSCHE and CORVETTE as the 2UEx(M) main effort (ME) to destroy enemy forces in zone and seize objectives LION and TIGER. BPT attack eny forces across the international border or to the WEST of NORTHWEST. BPT to conduct combat operations NORTH and NORTHWEST in-zone, to destroy ARIAN forces bypassed during the attack, to assist in ejecting Eny remnants from CF territory

(2) 1HBCT Commander's Intent

- The purpose of TROJAN HORSE is to maneuver rapidly from an ATK pos along PL DENVER to seize OBJ LION and TIGER, destroy ARIANAN forces in zone and secure objectives along the international border to enable establishment of CASPIAN FEDERATION (CF) regional military stability.

(3) Neighboring units that could affect the operation.

1-66 CAB(Main effort)

- (a) O/O attack SOUTHEAST in zone along axis PORSCHE to secure OBJ DOG to defeat or bypass ARIANAN forces in zone.

- (b) O/O attack SOUTHEAST in zone along axis PORSCHE to secure OBJ LION to defeat or bypass ARIANAN forces in zone.

8th Sqdn 10th CAV

- (a) O/O conduct zone recce from PL DENVER to intermediate OBJ CAT and DOG.
- (b) O/O conduct zone recce from PL PEARL to OBJ LION and TIGER.
- (c) O/O establish screen to the SHOUTHWEST of 1HBCT AO across the IB to provide early warning.
- (d) BPT continue zone recce forward of 1 HBCT across the IB to locate Eny and direct fires in supp of 1HBCT attack.

c. Attachments and Detachments

- Annex A Task Org

d. Commander's Evaluation.

- (1) This OPO regulates the attack against OBJ Tiger
- (2) Pre-condition: The Eny forces in our AO has been reduced to 40% effectiveness by higher echelon
- (3) Assumptions: The Eny will not stay and fight in his current positions.

2.MISSION

1-22CAB will O/O attack in zone along ROUTE CORVETTE to secure OBJ CAT and OBJ TIGER.

1-221(tank) and 1-223(Mech) will attack towards OBJ CAT supported by 1-222(tank) and 1-224mech in the terrain SOUTH of ROUTE CORVETTE. 1-222 and 1-224 is to fix the enemy towards OBJ CAT to allow 1-221and 1-223 to defeat the ENY in zone. From OBJ CAT I will continue the attack at one axis until the battalion has crossed the mash land EAST of PL RUBY. From PL RUBY I will attack on two axis iot secure OBJ TIGER and link up with 1-66 CAB in the SOUTH. During the operation ENG support will be prioritized for mobility efforts.

3. EXECUTION

Intent: The intent of this operation is to destroy or bypass ENY forces in zone iot facilitate CF regional military stability. This will be done by seizing OBJ CAT and TIGER with the Bn moving along Axis CORVETTE. End state is reached when OBJ TIGER is secured.

a. Concept of operation

Annex C Ops Overlay.

b. Tasks/Mission(s) to maneuver units

1-221 Tank Coy

1. O/O attack along ROUTE CORVETTE. Destroy or bypass ARIANAN forces in zone.
2. Secure NORTHERN part of OBJ CAT.
3. Secure NORTHERN part of OBJ TIGER

1-222 Tank Coy

1. O/O attack SOUTH of ROUTE CORVETTE. Destroy or bypass ARIANAN forces in zone.
2. FIX ENY forces in OBJ CAT
2. Secure SOUTHERN part of OBJ CAT.
3. Secure SOUTHERN part of OBJ TIGER

1-223 Mech Coy

1. O/O attack along ROUTE CORVETTE. Destroy or bypass ARIANAN forces in zone.
2. Secure NORTHERN part of OBJ CAT.
3. Secure NORTHERN part of OBJ TIGER

1-224 Mech Coy4

1. O/O attack SOUTH of ROUTE CORVETTE. Destroy or bypass ARIANAN forces in zone.
2. FIX ENY forces in OBJ CAT
2. Secure SOUTHERN part of OBJ CAT.
3. Secure SOUTHERN part of OBJ TIGER



Copy No 1 of 1 copies

Issuing Headquarters: 1-22CAB HQ

Place of Issue:

Date-Time Group of Signature:

Message Reference No.

OPERATION ORDER NO 001

References: See OPORD 2010-14 (OP TROJAN HORSE) 1HBCT

Time Zone: CHARLIE

Task Organization: Annex A ORBAT

c. Tasks/Mission(s) to combat support units

Recce Plt: Route recce in force ROUTE CORVETTE

Mortar plt: Annex D fire support
Eng Coy: Annex F Engineer

- ### d. Coordinating instructions (It may include the following)
- (1) CCIR:
 - (2) Deception guidance
 - (3) Specific priorities, in order of completion
 - (4) Time line
 - (5) Guidance on orders and rehearsals

4. ADMINISTRATION/LOGISTICS

a. Support Concept

Annex R

b. Materiel and Services

- (1) Supply
- (2) Maintenance
- (3) Transportation
- (4) Construction

c. Medical Evacuation and Hospitalization

- (1) Location of units medical facilities
- (2) Evacuation route(s)

d. Personnel

e. Civil-Military Cooperation

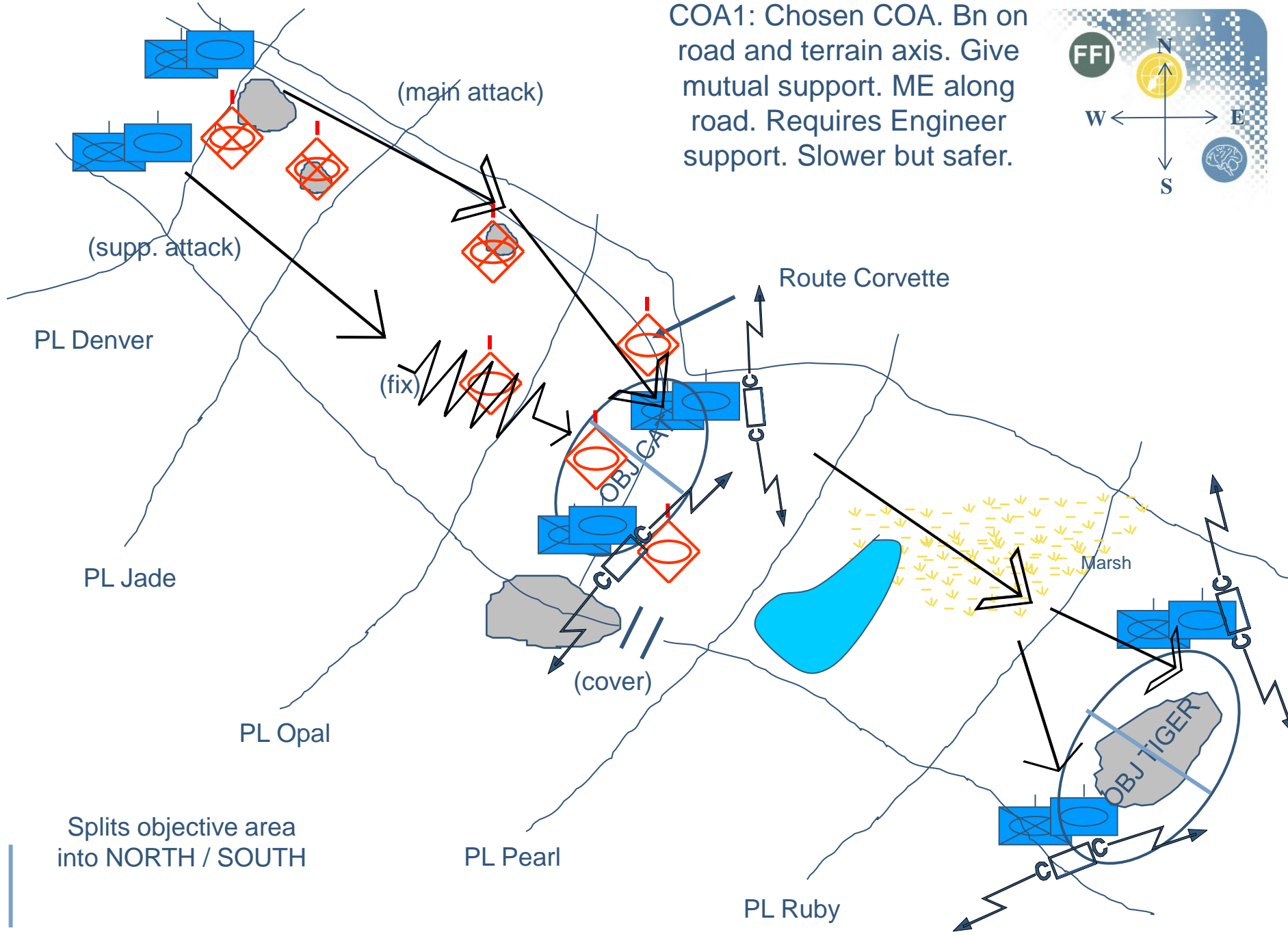
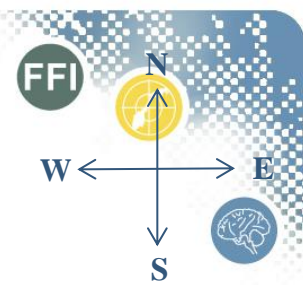
- (1) Control of civilian population
- (2) Refugees

f. Miscellaneous

5. COMMAND AND SIGNAL

- ### a. Command, Control, and Communications.
- ### b. Signal

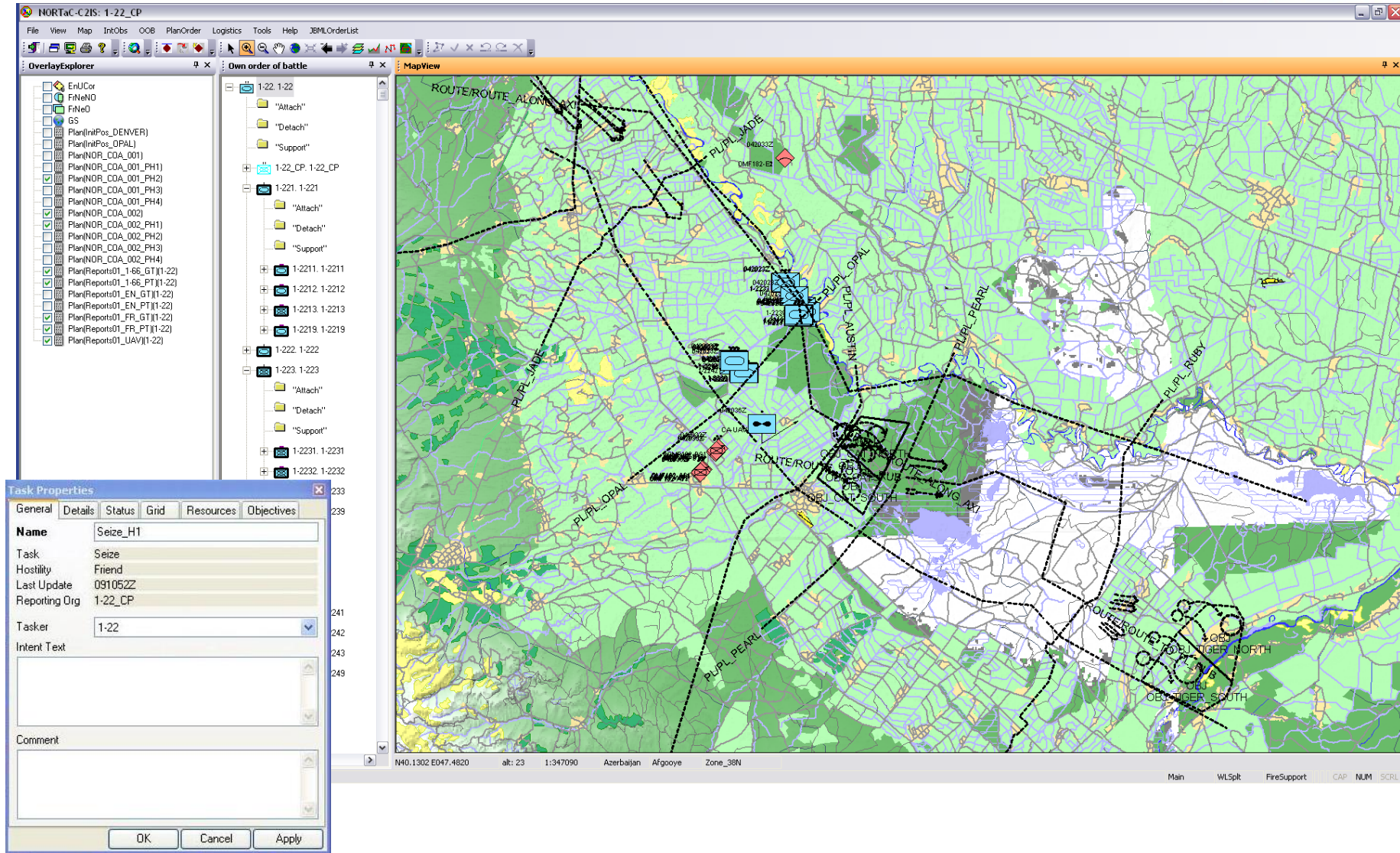
COA1: Chosen COA. Bn on road and terrain axis. Give mutual support. ME along road. Requires Engineer support. Slower but safer.



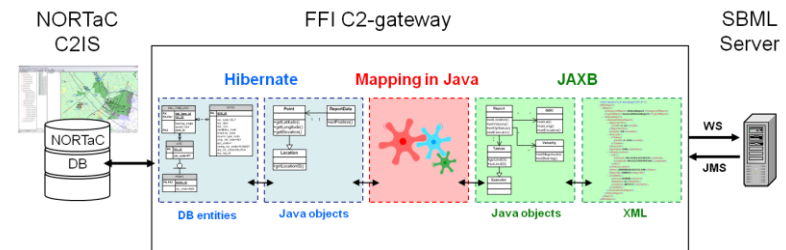


Detailing "Execution"

| Unit | Phase 1 from PL DENVER to PL AUSTIN | Phase 2 from PL AUSTIN to PL PEARL | | Phase 3 from PL PEARL to PL RUBY | Phase 4 from PL RUBY to TIGER | | |
|----------------|--|---|--|---|---|---|--|
| 1-221 Tank Sqn | Main attack along axis corvette (this indicates attack direction), control measure route corvette | Seize objective area CAT. (optional) Support by fire 1-222 and 1-224 | Secure objective area CAT_NORTH | Main attack along axis corvette, control measure route_to_TIGER | Main attack along axis corvette, control measure route_to_TIGER | Seize objective area TIGER_NORTH | Secure objective area TIGER_NORTH |
| 1-223 Mech Cpy | Main attack along axis corvette, control measure route corvette | Seize objective area CAT | Secure objective area CAT_NORTH | Main attack along axis corvette, control measure route_to_TIGER | Main attack along axis corvette, control measure route_to_TIGER | Seize objective area TIGER_NORTH | Secure objective area TIGER_NORTH |
| 1-222 Tank Sqn | Supporting attack along axis south of corvette, control measure route_to_CAT_SOUTH | Fix enemy in objective area CAT. (optional) Attack along axis route_to_CAT_SOUTH | Secure objective area CAT_SOUTH | Follow and support along route route_to_TIGER until phase line PL_RUBY | Supporting attack from phase line PL_RUBY along route_to_TIGER_SOUTH | Seize objective area TIGER_SOUTH | Secure objective area TIGER_SOUTH |
| 1-224 Mech Cpy | Supporting attack along axis south of corvette, control measure route_to_CAT_SOUTH | Fix enemy in objective area CAT. (optional) Attack along axis route_to_CAT_SOUTH | Secure CAT_SOUTH | Follow and support along route_to_TIGER until phase line PL_RUBY | Supporting attack from phase line PL_RUBY along route_to_TIGER_SOUTH | Seize objective area TIGER_SOUTH | Secure objective area TIGER_SOUTH |

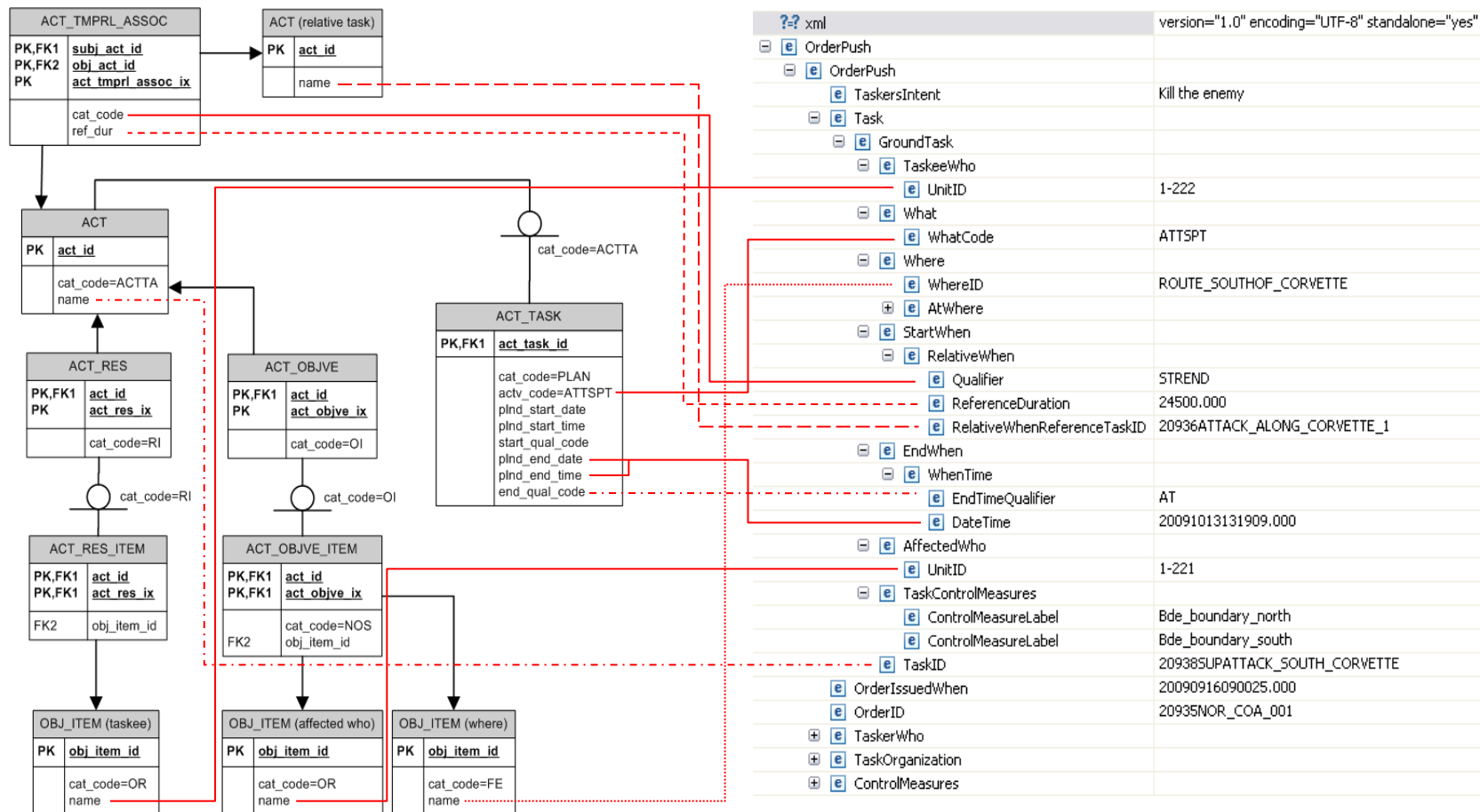


- An order is defined as tasks, control measures and resources and is stored into JC3IEDM
- Tasks defined graphically
- Task properties defined through dialog boxes





BML-JC3IEDM mapping in NORTaC-C2IS



<TaskersIntent>**Destroy or bypass ENY forces in zone iot facilitate CF regional military stability**</TaskersIntent>

- <Task>

- <GroundTask>

- <TaskerWho>

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WHO

</TaskerWho>

- <What>

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WHAT

</What>

- <Where>

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WHERE

- <AtWhere>

- <JBMLAtWhere>

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</GDC>

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+ <WhereLocation Sequence="3">

+ <WhereLocation Sequence="4">

</WhereValue>

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</JBMLAtWhere>

</AtWhere>

</Where>

- <StartWhen>

- <WhenTime>

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WHEN

</WhenTime>

</StartWhen>

- <TaskControlMeasures>

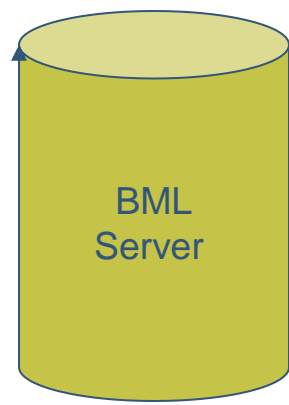
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WHY



Web Service



BML
Server



Summary

- C-BML digitizes C2 information and standardizes the M&S-C2 interface
- C-BML can change the way we conduct C2 and is an enabler for use of M&S in support of C2
- A C-BML standard is being developed by SISO
- NATO RTO activities (MSG-048/MSG-085) play an important role in multinational testing of and experimentation with C-BML